Stoller
Hanford Office

DOE-EM/GJ1214-2006

199-K-109A (A9828)
Log Data Report

Borehole Information:

Borehole: 199-K-109A (A9828)			Site: 100-KR-2		
Coordinates (WA St Plane)		GWL[1] (ft): 74.95		GWL Date: 05/22/06	
North	East	Drill Date	Elevation (TOC)	Total Depth (ft)	Type
146748.50	569122.18	09/94	Not available	164.9	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	3.0	6 5/8	6	5/16	3.0	unknown
Schedule 80 PVC	1.4	4.5	3.826	0.337	1.4	70

Borehole Notes:

The 6-in. casing appears to be a protective casing for the 4-in. PVC casing. The depth of the 6-in. casing is unknown but is expected to penetrate the ground by only a few ft. Casing diameter and stickup measurements for the 6-in. casing were acquired using a caliper and steel tape. The PVC casing is reported to extend to 69.6 ft below ground surface (bgs) or 72.6 ft from TOC. Note: All measurements are in relation to TOC. A 4-in. stainless steel wire wrap pipe extends from 72.6 to 92.8 ft. Logging was terminated just above the beginning of the wire wrap pipe. Casing diameter measurements for the PVC casing are derived from published data for 4-in. schedule 80 PVC pipe.

A 13-in. diameter borehole was drilled from the ground surface to 18 ft and an 11-in. borehole from 18 to 95.5 ft. Bentonite pellets were placed in the annular space between 64.4 and 67.4 ft. The annular space between the 4-in. casing and the formation was sealed with grout from 64.4 ft to the ground surface.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System: Gamma 1G		Type: SGLS (35%) SN: 45-TP10951A
Effective Calibration Date: 11/29/05	Calibration Reference:	DOE/EM-GJ1052-2005
	Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3 Repeat	4	
Date	05/22/06	05/23/06	05/24/06	05/24/06	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	3.0	41.0	28.0	59.0	
Finish Depth (ft)	42.0	60.0	34.0	69.0	

Log Run	1	2	3 Repeat	4	
Count Time (sec)	200	200	200	200	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	1.0	1.0	1.0	1.0	
ft/min	N/A[2]	N/A	N/A	N/A	
Pre-Verification	AG103CAB	AG104CAB	AG105CAB	AG105CAB	
Start File	AG103000	AG104000	AG105000	AG105007	
Finish File	AG103039	AG104019	AG105006	AG105017	
Post-Verification	AG103CAA	AG104CAA	AG105CAA	AG105CAA	
Depth Return Error (in.)	- 1	0	N/A	+ 1	
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	

Logging Operation Notes:

Because of the small borehole diameter, logging was conducted with no centralizer on the sonde. Measurements are referenced to the top of casing. A repeat section was collected in the borehole to evaluate the logging system's performance.

Analysis Notes:

Analyst:	Henwood	Date:	06/06/06	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging system were performed before and after each day's data acquisition. Acceptance criteria were met.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G1GNov05.xls. SGLS calibrations for correction of gamma attenuation by PVC pipe are not available. In addition grout has been emplaced in the annular space outside the PVC pipe for which there is no correction. Modeling was conducted using ISOCS to simulate this borehole environment to determine corrections for the HPGe detector. The energy dependent corrections were applied to the data. It is assumed the ^{137}Cs and ^{152}Eu contaminants are in the formation and not the grout, thus, the corrections for grout and PVC casing are appropriate and the concentrations determined for ^{137}Cs and ^{152}Eu are considered reasonable estimates. For the naturally occurring radionuclides, the gamma contribution from the grout cannot be discriminated from the contribution from the formation. Therefore, the concentrations from the naturally occurring radionuclides cannot be accurately determined. No corrections for dead time or water were required.

Results and Interpretations:

^{137}Cs was detected between 28 and 40 ft with a maximum concentration of 16 pCi/g measured at 33 ft.

^{152}Eu was detected between 30 and 34 ft and at 42 ft. The maximum concentration is measured at 1.3 pCi/g at 32 ft.

The concentrations of the naturally occurring radionuclides resulting from grout or the sediments cannot be distinguished. Variations in the profile may not represent the activity of the sediment. For example, the bentonite pellets emplaced in the borehole between 64 and 68 ft are indicated by the relatively high concentrations of ^{238}U and ^{232}Th. Elevated radon was observed in this borehole.

The repeat section for the SGLS indicates good agreement for the naturally occurring and manmade radionuclides.

Westinghouse Hanford Company logged this borehole in 1994 with a NaI total gamma detection system. The profile is consistent with the current SGLS total gamma log. Westinghouse estimated a ^{137}Cs concentration of less than 20 pCi/g, which is also consistent with current log data. The ^{152}Eu detected with the SGLS in 2006 was not observed in 1994.

List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
Repeat Section for Man-made Radionuclides
Repeat Section of Natural Gamma Logs

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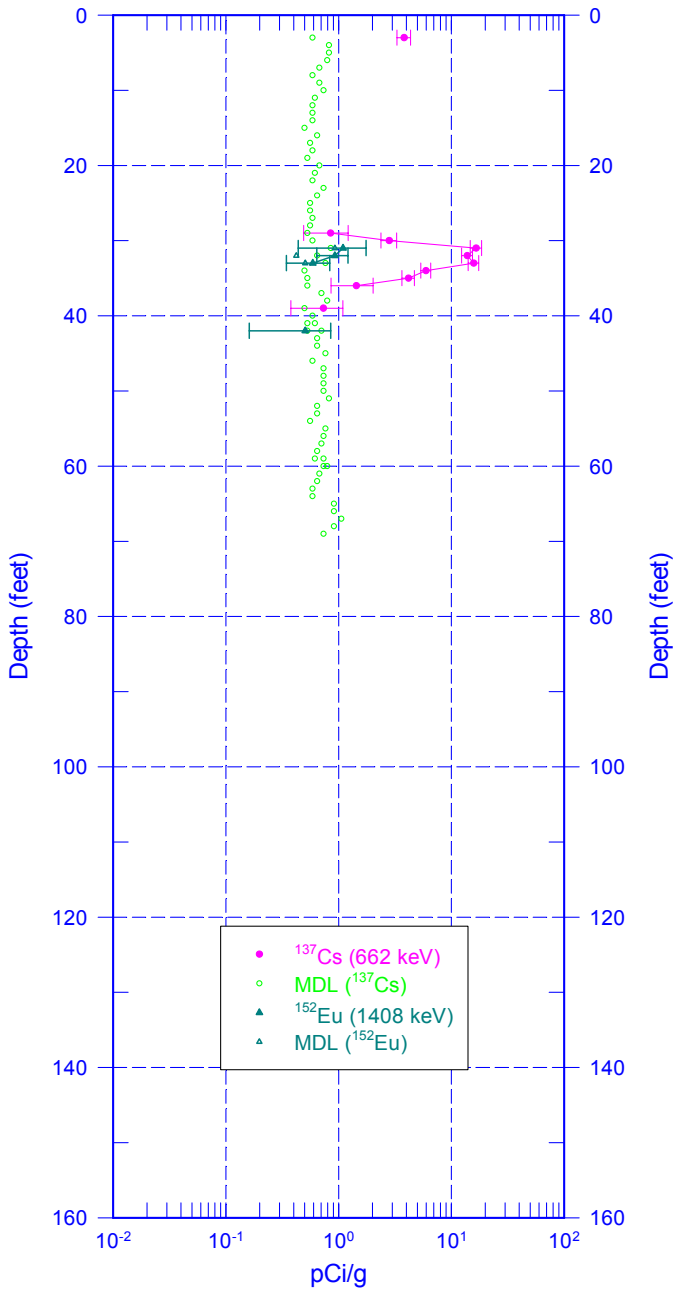
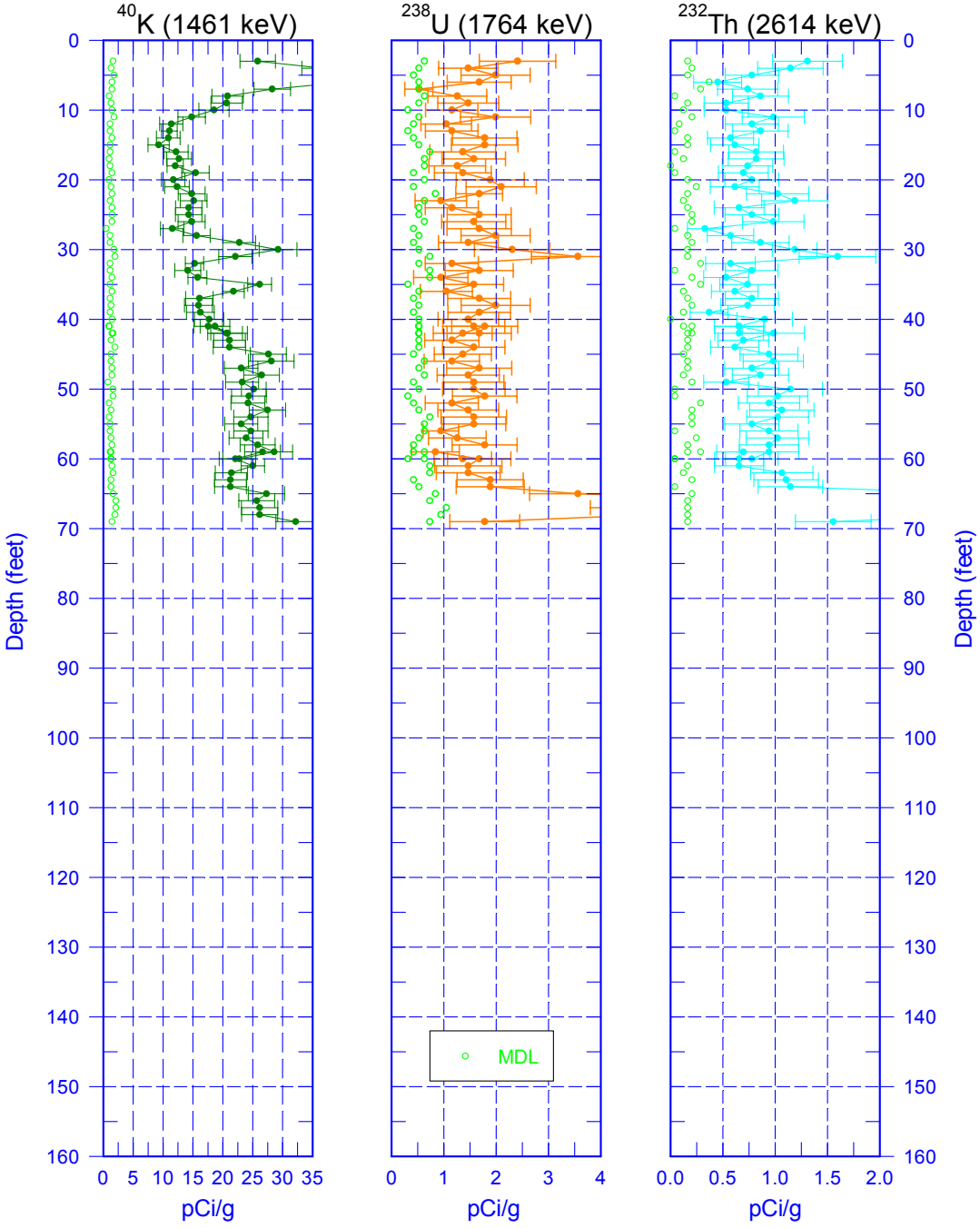
[1] GWL – groundwater level
[2] N/A – not applicable

199-K-109A (A9828)
Man-Made Radionuclides



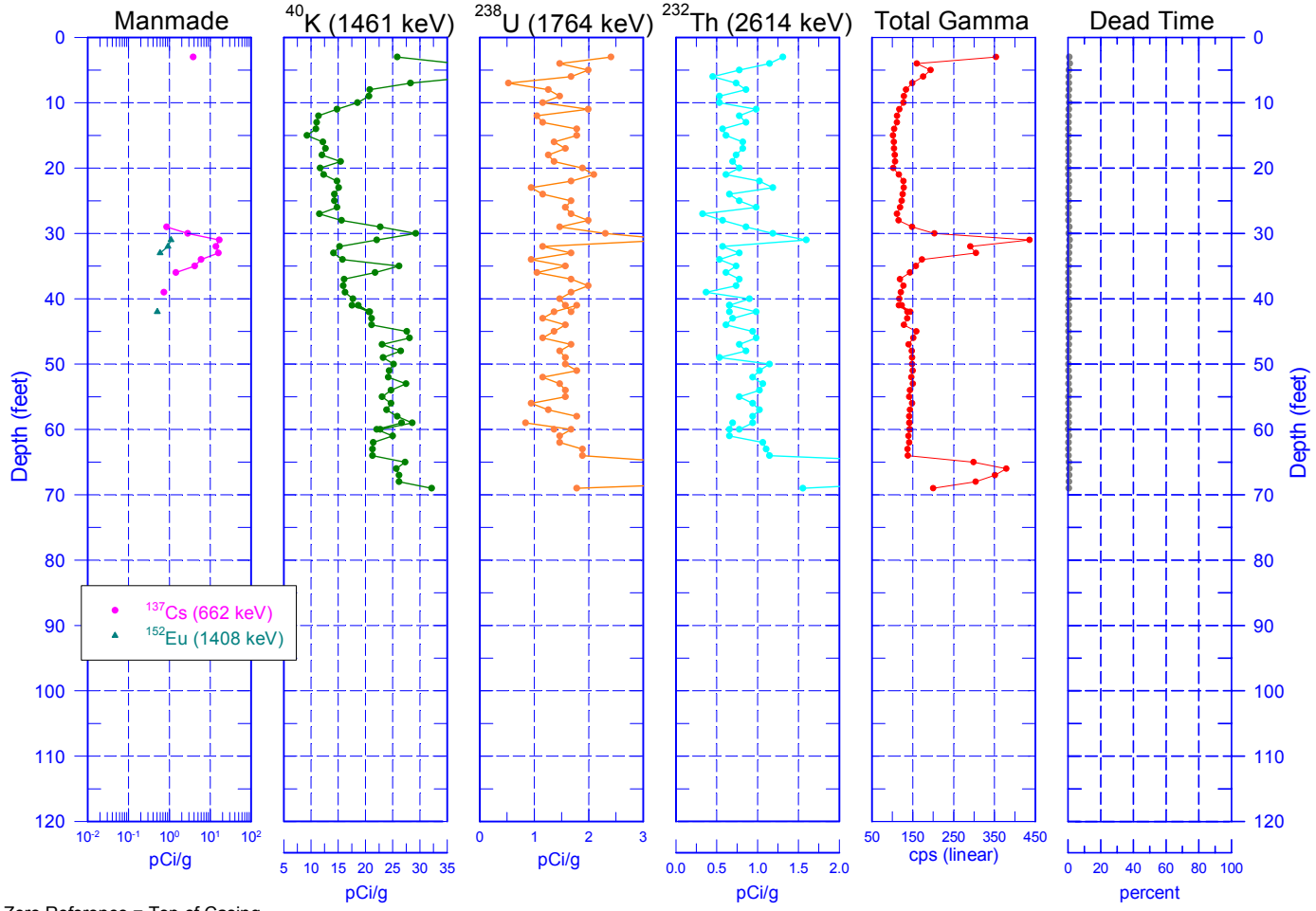
Zero Reference = Top of Casing

199-K-109A (A9828)
Natural Gamma Logs

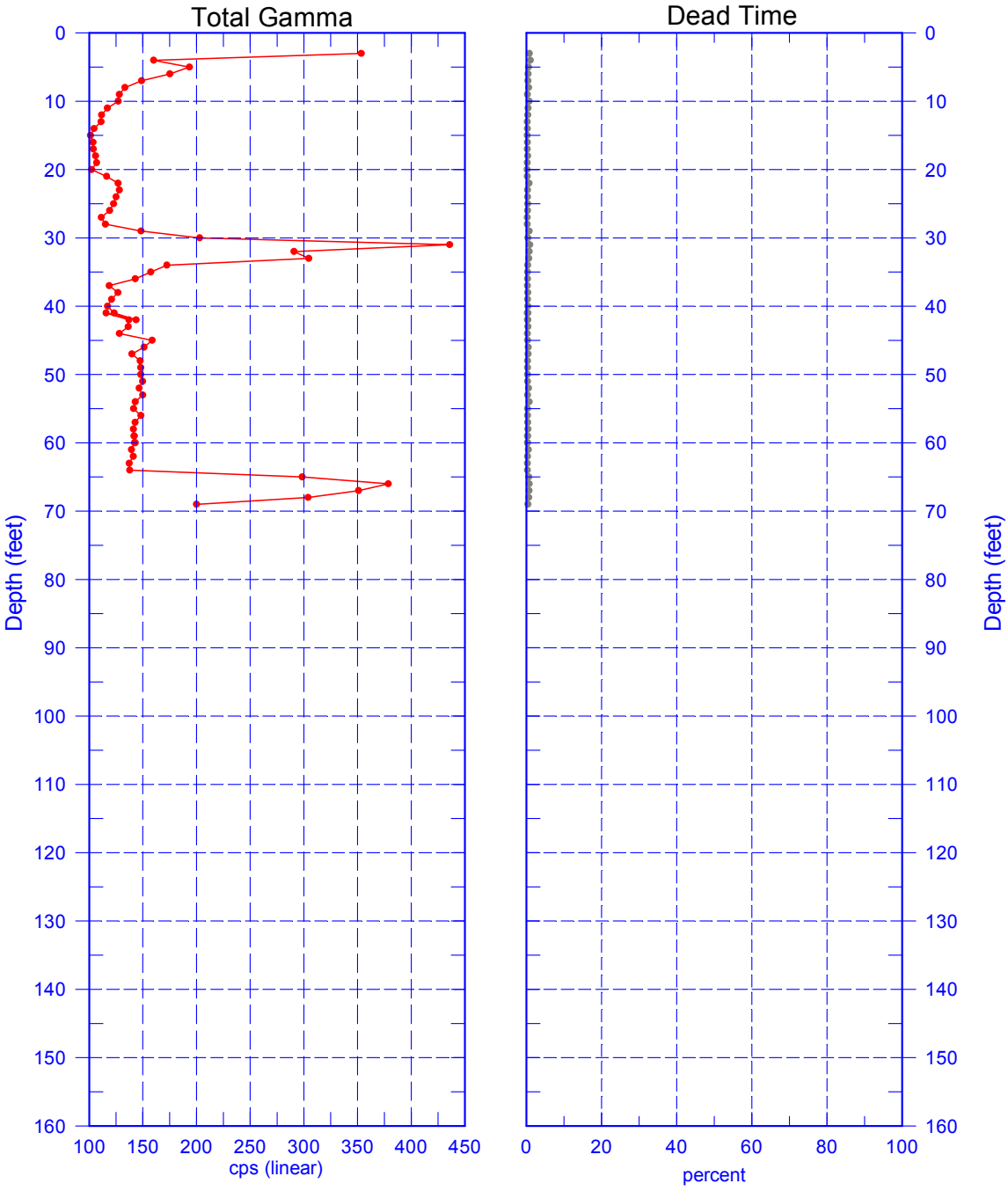


Zero Reference = Top of Casing

199-K-109A (A9828) Combination Plot

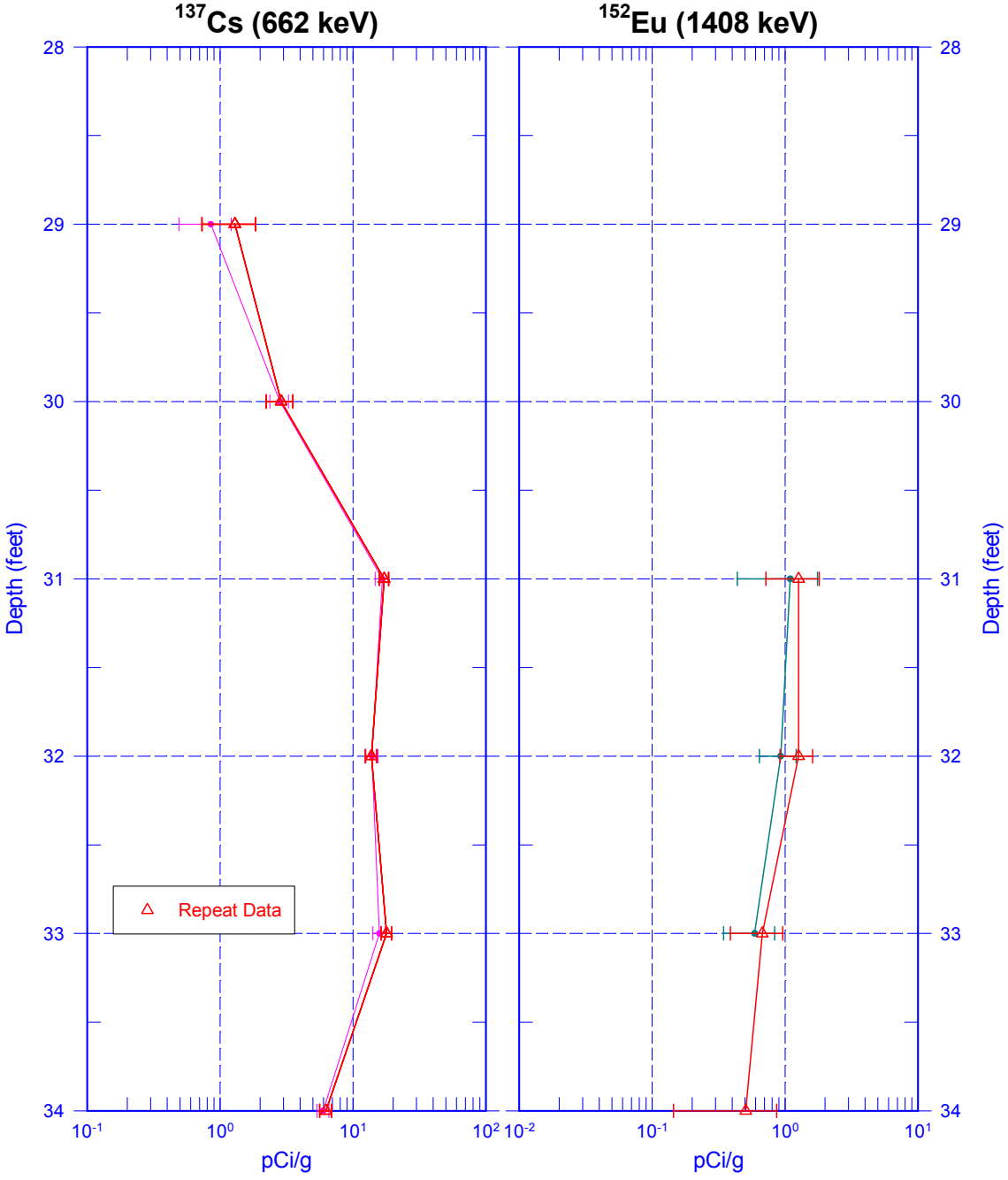


199-K-109A (A9828)
Total Gamma & Dead Time



Reference - Top of Casing

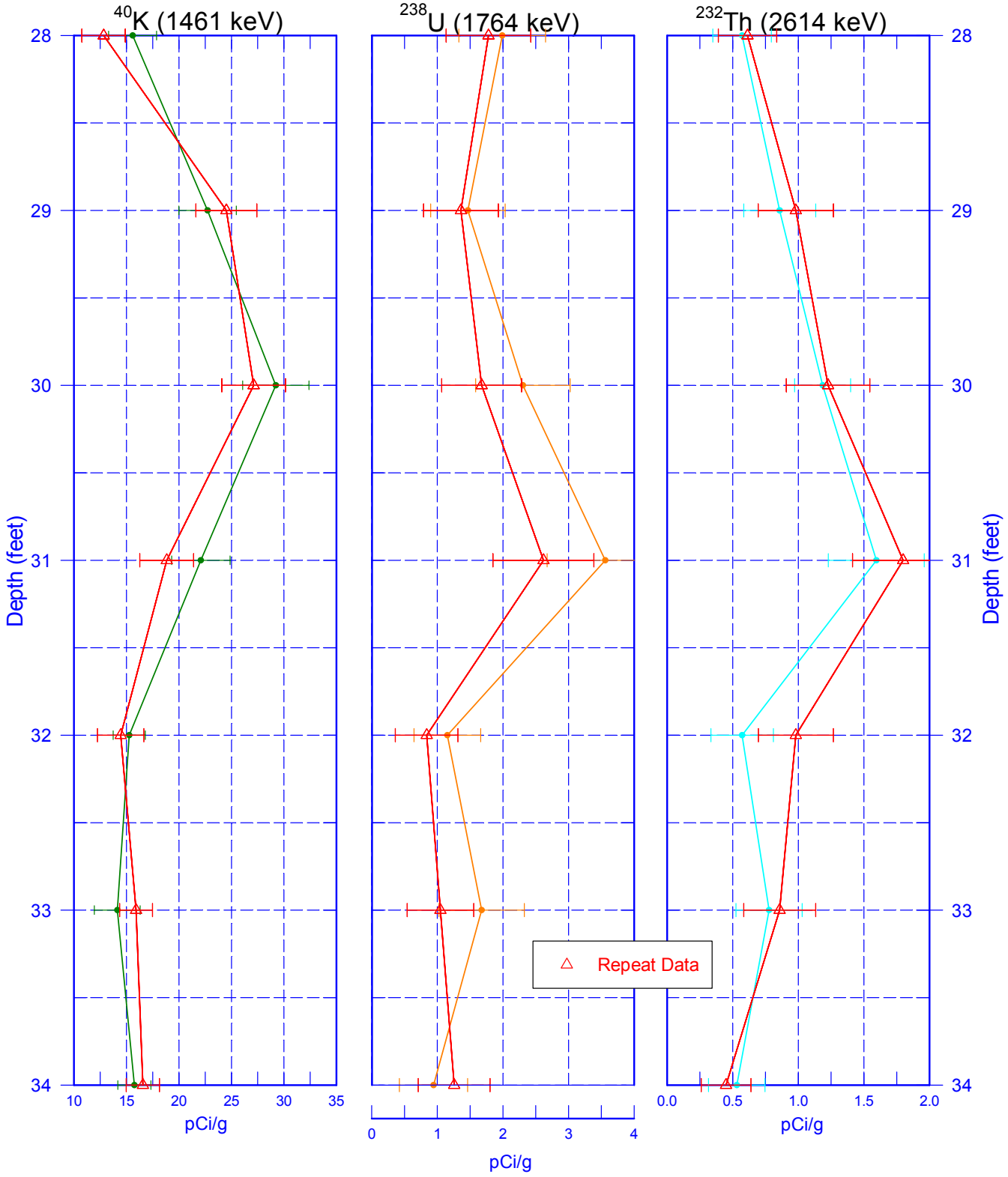
199-K-109A (A9828)
Repeat Section for Man-Made Radionuclides



Zero Reference = Top of Casing

199-K-109A (A9828)

Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing